802.3at PD Conformance Test Suite Parameters and PICS Coverage

Sifos® Technologies

Parameter	Description	Units	Acceptance Criteria (802.3at references)	PICS
Detection & Classification				
Rdet	Detection resistance (2.7 to 10.1 V band) from a single probe.	KΩ	23.7 to 26.3 802.3at Table 33-14	PD7 PD8 PD11
Rdet_final	Detection resistance after multiple detection and classification probing sequences. Evaluate response to PSE's that probe repeatedly prior to power-up.			
Rdet_at_Vmin	Detection resistance at different chords in the 2.7 to 10.1 V band. (not supported by PDA-602A)	KΩ	802.3at Table 33-14	PD10 (partial)
Rdet_at_Vmax				
Rdet_unpwr	Non-valid detection resistance presented by the unpowered pairset.	KΩ	< 12 or > 45 802.3at para. 33.3.4, Table 33-15	PD9
Cdet	Detection capacitance (2.7 to 10.1 V band)	µF	0.05 to 0.12 802.3at Table 33-14	PD8 PD11
Cdet_final	Detection capacitance after multiple detection and classification probing sequences. Evaluate response to PSE's that probe repeatedly prior to power-up.			
Iclass	Classification current signature, 1 event classification.	mA	0-4, 9-12, 17-20, 26-30, or 36-44	PD12 PD13
ClassNum	PD Class determined from **Iclass**	PD Class	0, 1, 2, 3, or 4 (respectively)	PD14 (partial)
Iclass_at_Vmin	Classification current signature at low and high edge of 14.5 - 20.5 V band. (not supported by PDA-602A)	mA	0-4, 9-12, 17-20, 26-30, or 36-44 802.3at Tables 33-16, 33-17	PD15 PD16 PD17 PD18
Iclass_at_Vmax				
Tclass	Time from when **Vport** = 15.5VDC until class current reaches valid level	seconds	< 0.005 802.3at 33.3.7.8 & Table 33-18	PD19 (partial) PD20 PD21
ClassStability	Class current remains in valid range during classification period that ranges from 6-75 msec	flag (1 or 0)	All class samples = Iclass 802.3at para. 33.3.7.8	PD22 PD23 PD42
Iclass_event1	Classification current signature during 1st Classification pulse, 2-Event classification.	mA	0-4, 9-12, 17-20, 26-30, or 36-44 802.3at Table 33-16	
Iclass_event2	Classification current signature during 2nd Classification pulse, 2-Event classification.	mA		
MarkI	Current drawn during mark region of 2-Event classification.	mA	0.25 to 4 802.3at Table 33-17	
ClassNum2	PD Class determined from Iclass during 2-Event classification.	PD_Class	0, 1, 2, 3, or 4	
Tclass_event1	Time from when Vport = 15.5VDC until class current reaches valid level, during 1st Classification pulse, 2-Event classification	seconds	< 0.005 802.3at 33.3.7.8 & Table 33-18	
Tclass_event2	Time from when Vport = 15.5VDC until class current reaches valid level, during 2nd Classification pulse, 2-Event classification	seconds		
ClassStability_event1	Class current remains in valid range during classification period, 1st class pulse.	flag (1 or 0)	All class samples = Iclass 802.3at para. 33.3.7.8	
ClassStability_event2	Class current remains in valid range during classification period, 2nd class pulse.	flag (1 or 0)		
Power-Up / Down				
Inrushl_1	Highest current drawn during the first 50 msec after power on. Power on is preceeded by a 1 event classification.	mA	< 400mA A PD may draw more than 400mA if it presents capacitive load, **Cport** < 180uF. Because **Cport** cannot be measured, out-of-limit performance is flagged with WARN, not FAIL. 802.3at Table 33-18 & para. 33.3.7.3.	PD30 PD31
Inrushl_2 *(Type-2 testing)*	Highest current drawn during the first 50 msec after power on. Power on is preceeded by a 2 event classification.	mA		
Pmax_Tdelay *(Type-2 testing)*	Highest power consumed during the period from 50 msec to 80 msec after power-up that is preceded by 2-Event classification.	watts	< 14.4 A Type-2 PD must not draw a peak power exceeding Type-1 PD maximum peak power of 14.4W during 30msec between end of inrush and **Tdelay**. 802.3at para. 33.3.7.3.	
Inrush_delayed	Flags a PD behavior where the start of inrush is delayed by more than 1ms after power-up and where inrush level (>400mA) may require current limiting by a PSE. PDs that delay inrush and exceed 400mA may not experience 450mA current limiting by a PSE that applies the "**legacy_powerup**" exception. See 802.3at, para. 3.2.4.4.	flag (1 or 0)	flag= 0 if; Inrush Current < 400 mA or Inrush Current (@ > 1 msec) ≤ Current (@ < 1 msec)	
IlimMinViolation	Flags a PD behavior where the DUT draws >400mA after T_{inrush} has completed, when the PD is powered following 1 event classification. This may cause current limiting by a PSE, and the resulting reduction in voltage could cause the PD to not successfully power on. (this check was added based on an interop problem case)	flag (1 or 0)	flag= 0 if Current > 400 mA during the 1.5 second interval starting at the completion of T_{inrush}.	PD33
Von	Voltage at which PD starts to draw load current	VDC	30 to 42, 802.3at Table 33-18	PD25
Voff	Voltage at which PD stops drawing load current	VDC	> 30, 802.3at Table 33-18. WARN if > 37VDC, based on the lowest voltage that a Type 1 PSE could provide.	PD27 PD28
Vhyst	Hysteresis band between **Von** and **Voff**.	VDC	Provided for information purposes. There is no explicit value for hysteresis specified in Table 33-18, but the need for hysteresis is implied by 802.3at para. 33.3.7.1 (*startup oscillation*).	
BackfeedV	Voltage present on the unpowered pair with V_{port_PD} max applied. Unpowered pair is terminated with 100kΩ.	VDC	0 to 2.8 802.3at Table 33-18, para. 33.3.7.9	PD43
ClassRecover	Flag indicating that PD classification signature following power removal and PD restoration of a potentially acceptable detection signature (i.e. between 15kΩ and 33KΩ) does not match expected PD classification signature.	flag (1 or 0)	A value of "1" will be reported with a V[redacted]status because PSE's will possibly mis-classify this PD following power-removal events.	
SigRecoverTime	Time to restore expected PD classification signature if **ClassRecover** is reported as "1". Otherwise, vaue reported is "0 sec". Measured from PD shutdown.	seconds	A PD need not present a valid classification signature until that PD first presents a valid detection signature, so there is no clear specification time limit.	
MDI Powered Type-1	***PD-under-test powered to Type-1 Vport with 1-Event Classification***			
MinI_1	Minimum current drawn by the PD while powered on at Type-1 **VPort_PD**	mA	0 to (**Pclass_PD** / **VPort_PD**) 802.3at para. 33.3.7.4, Table 33-18	PD24 (partial) PD26
MaxI_1	Maximum current drawn by the PD while powered on at Type-1 **Vport_PD**. The maximum current must exceed **Iport_mps**.	mA	10 to (**Pclass_PD** / **VPort_PD**) 802.3at para. 33.3.7.4, Table 33-18 **Iport_mps** > 10, 802.3at para. 33.3.8	PD29 PD32 PD33
Vport_1	Vport level at the point where the **MaxI_1** occurs.	V	**VPort_PD** should conform to ranges in 802.3at Table 33-18	PD34 (partial) PD35
Ppeak_1	Maximum instantaneous power consumed by the PD while powered on at Type-1 **Vport_PD**	watts	< **PPeak_PD** (for PD Classification) 802.3at Table 33-18, para. 33.3.7.4	PD37 **only if MPS
Pavg_1	Average power (1 second moving window) consumed by the PD while powered on a Type-1 **Vport_PD**	watts	< **Pclass_PD** (for PD Classification) 802.3at Table 33-18, para. 33.3.7.2	low pwr PD44
MPSViolation_1	Flag indicating PD did not satisfy DC Maintain Power Signature (MPS) and will be potentially subject to shutdown by a PSE using DC MPS method.	flag (1 or 0)	In order to stay powered, the PD must draw > 10mA for a time period > 75 msec out of every 325 msec time interval. 802.3at para. 33.3.8	PD45
TcutWindowViolation_1	Flag indicating that PD power draw exceeded **Pclass_PD** for longer than **Tcut_min** (50 msec). PD is at risk of overload shutdown by PSE.	flag (1 or 0)	In order to stay powered, transient loads may not exceed **Pclass_PD** for time duration > **Tcut_min**, or 50 msec. 802.3at para. 33.3.7.4.	
DutyCycleViolation_1	Flag indicating that PD power draw is exceeding **Pclass_PD** for greater than 5% of the time. PD is at risk of overload shutdown by PSE.	flag (1 or 0)	In order to stay powered, transient loads may not exceed **Pclass_PD** for > 5% duty cycle. 802.3at para. 33.3.7.4.	
MDI Powered Type-2	***PD-under-test powered to Type-2 Vport with 2-Event Classification***			
MinI_2	Minimum current drawn by the PD while powered on at Type-2 **Vport_PD** prior to LLDP power allocation.	mA	0 to (25.5W / **VPort_PD**) 802.3at para. 33.3.7.4, Table 33-18	PD24 (partial) PD26
MaxI_2	Maximum current drawn by the PD while powered on at Type-2 **Vport_PD** prior to LLDP power allocation. The maximum current must exceed **Iport_mps**.	mA	10 to (25.5W / **VPort_PD**) 802.3at para. 33.3.7.4, Table 33-18 Iport_mps > 10, 802.3at para. 33.3.8	PD29 PD32 PD33
Vport_2	Vport level at the point where the **MaxI_2** occurs.	V	**VPort_PD** should conform to ranges in 802.3at Table 33-18	PD34 (partial) PD35
Ppeak_2	Maximum instantaneous power consumed by the PD while powered on at Type-2 **VPort_PD**	watts	< 28.3 802.3at Table 33-18, para. 33.3.7.4	PD37 **only if MPS

802.3at PD Conformance Test Suite Parameters and PICS Coverage

Sifos Technologies

Parameter	Description	Units	Acceptance Criteria (802.3at references)	PICS
Pavg_2	Average power (1 second moving window) consumed by the PD while powered on a Type-2 **VPort_PD**	watts	< 25.5 802.3at Table 33-18, para. 33.3.7.2	low pwr PD44
MPSViolation_2	Flag indicating PD did not satisfy DC Maintain Power Signature (MPS) and will be potentially subject to shutdown by a PSE using DC MPS method.	flag (1 or 0)	In order to stay powered, the PD must draw > 10mA for a time period > 75 msec out of every 325 msec time interval. 802.3at para. 33.3.8.	PD45
TcutWindowViolation_2	Flag indicating that PD power draw exceeded 25.5W for longer than **Tcut_min** (50 msec). PD is at risk of overload shutdown by PSE.	flag (1 or 0)	In order to stay powered, transient loads may not exceed 25.5W for time duration > **Tcut_min**, or 50 msec. 802.3at para. 33.3.7.4.	
DutyCycleViolation_2	Flag indicating that PD power draw is exceeding 25.5W for greater than 5% of the time. PD is at risk of overload shutdown by PSE.	flag (1 or 0)	In order to stay powered, transient loads may not exceed 25.5W for > 5% duty cycle. 802.3at para. 33.3.7.4.	
MDI Powered Type-2 LLDP	***PD-under-test powered to Type-2 Vport with 1-Event Classification and subsequent LLDP Negotiatio***			
MinI_PreAlloc	Minimum current drawn by the PD while powered on at Type-2 **Vport_PD** prior to LLDP power allocation.	mA	0 to (13W / **VPort_PD**) 802.3at para. 33.3.3.5, Table 33-18	PD24 (partial) PD26
MaxI_PreAlloc	Maximum current drawn by the PD while powered on at Type-2 **Vport_PD** prior to LLDP power allocation. The maximum current must exceed **Iport_mps**.	mA	10 to (13W / **VPort_PD**) 802.3at para. 33.3.3.5, Table 33-18 **Iport_mps** > 10, 802.3at para. 33.3.8	PD29 PD32 PD33
Vport_PreAlloc	Vport level at the point where the **MaxI_PreAlloc** occurs.	V	**VPort_PD** should conform to ranges in 802.3at Table 33-18	PD34 (partial) PD35
Ppeak_PreAlloc	Maximum power consumed by the PD while powered on at Type-2 Vport prior to LLDP power allocation.	watts	< 14.4 802.3at Table 33-18, para. 33.3.3.5	PD37 PD44
Pavg_PreAlloc	Average power (1 second moving window) consumed by the PD while powered on at Type-2 Vport prior to LLDP power allocation.	watts	< 25.5 802.3at Table 33-18, para. 33.3.3.5	PD45 DLL4 DLL7
MPSViolation_PreAlloc	Flag indicating PD did not satisfy DC Maintain Power Signature (MPS) and will be potentially subject to shutdown by a PSE using DC MPS method. Measured before LLDP power allocation.	flag (1 or 0)	In order to stay powered, the PD must draw > 10mA for a time period > 75 msec out of every 325 msec time interval. 802.3at para. 33.3.8.	DLL9 DLL11
TcutWindowViolation_PreAlloc	Flag indicating that PD power draw exceeded 13W for longer than **Tcut_min** (50 msec). PD is at risk of overload shutdown by PSE. Measured before LLDP power allocation.	flag (1 or 0)	In order to stay powered, transient loads may not exceed 13W for time duration > **Tcut_min**, or 50 msec. 802.3at para. 33.3.7.4.	
DutyCycleViolation_PreAlloc	Flag indicating that PD power draw is exceeding 13W for greater than 5% of the time. PD is at risk of overload shutdown by PSE. Measured before LLDP power allocation.	flag (1 or 0)	In order to stay powered, transient loads may not exceed 13W for > 5% duty cycle. 802.3at para. 33.3.7.4.	
MinI_PostAlloc	Minimum current drawn by the PD while powered on at Type-2 **Vport_PD** following LLDP power allocation.	mA	0 to (**Pclass_PD** / **VPort_PD**) 802.3at para. 33.3.7.4, Table 33-18	
MaxI_PostAlloc	Maximum current drawn by the PD while powered on at Type-2 **Vport_PD** following LLDP power allocation.	mA	10 to (**Pclass_PD** / **VPort_PD**) 802.3at para. 33.3.7.4, Table 33-18 **Iport_mps** > 10, 802.3at para. 33.3.8	
Vport_PostAlloc	Vport level at the point where the **MaxI_PostAlloc** occurs.	V	**VPort_PD** should conform to ranges in 802.3at Table 33-18	
Ppeak_PostAlloc	Maximum power consumed by the PD while powered on at Type-2 **Vport_PD** following LLDP power allocation.	watts	≤ **Ppeak_PD** 802.3at Table 33-18, para. 33.3.3.5	
Pavg_PostAlloc	Average power (1 second moving window) consumed by the PD while powered on at Type-2 **Vport_PD** following LLDP power allocation.	watts	≤ **Pclass_PD** 802.3at Table 33-18, para. 33.3.3.5	
MPSViolation_PostAlloc	Flag indicating PD did not satisfy DC Maintain Power Signature (MPS) and will be potentially subject to shutdown by a PSE using DC MPS method. Measured after LLDP power allocation.	flag (1 or 0)	In order to stay powered, the PD must draw > 10mA for a time period > 75 msec out of every 325 msec time interval. 802.3at para. 33.3.8.	
WindowViolation_PostAlloc	Flag indicating that PD power draw exceeded **Pclass_PD** for longer than **Tcut_min** (50 msec). PD is at risk of overload shutdown by PSE. Measured after LLDP power allocation.	flag (1 or 0)	In order to stay powered, transient loads may not exceed **Pclass_PD** for time duration > **Tcut_min**, or 50 msec. 802.3at para. 33.3.7.4.	
DutyCycleViolation_PostAlloc	Flag indicating that PD power draw is exceeding **Pclass_PD** for greater than 5% of the time. PD is at risk of overload shutdown by PSE. Measured after LLDP power allocation.	flag (1 or 0)	In order to stay powered, transient loads may not exceed 13W for > 5% duty cycle. 802.3at para. 33.3.7.4.	
MinI_AfterThrottle	Minimum current drawn by the PD while powered on at Type-2 **Vport_PD** and following allocation reduction (or power demotion) by PSE.	mA	0 to (13W / **VPort_PD**) [redacted] limit - not a required behavior - 802.3at para. 33.6.3.5	
MaxI_AfterThrottle	Maximum current drawn by the PD while powered on at Type-2 **Vport_PD** and following allocation reduction (or power demotion) by PSE.	mA	10 to (13W / **VPort_PD**) [redacted] limit - not a required behavior - 802.3at para. 33.6.3.5 **Iport_mps** > 10, 802.3at para. 33.3.8	
Vport_AfterThrottle	Vport level at the point where the **MaxI_AfterThrottle** occurs.	V	**VPort_PD** should conform to ranges in 802.3at Table 33-18	
Ppeak_AfterThrottle	Maximum power consumed by the PD while powered on at Type-2 **Vport_PD** and following allocation reduction (or power demotion) by PSE.	watts	< 14.4 [redacted] limit - not a required behavior - 802.3at para. 33.6.3.5	
Pavg_AfterThrottle	Average power (1 second moving window) consumed by the PD while powered on at Type-2 **Vport_PD** and following allocation reduction (or power demotion) by PSE.	watts	< 25.5 [redacted] limit - not a required behavior - 802.3at para. 33.6.3.5	
MPSViolation_AfterThrottle	Flag indicating PD did not satisfy DC Maintain Power Signature (MPS) and will be potentially subject to shutdown by a PSE using DC MPS method. Measured after LLDP power demotion.	flag (1 or 0)	In order to stay powered, the PD must draw > 10mA for a time period > 75 msec out of every 325 msec time interval. 802.3at para. 33.3.8.	
TcutWindowViolation_AfterThrottle	Flag indicating that PD power draw exceeded 13W for longer than **Tcut_min** (50 msec). PD is at risk of overload shutdown by PSE. Measured after LLDP power demotion.	flag (1 or 0)	In order to stay powered, transient loads may not exceed 13W for time duration > **Tcut_min**, or 50 msec. 802.3at para. 33.3.7.4.	
DutyCycleViolation_AfterThrottle	Flag indicating that PD power draw is exceeding 13W for greater than 5% of the time. PD is at risk of overload shutdown by PSE. Measured after LLDP power demotion.	flag (1 or 0)	In order to stay powered, transient loads may not exceed 13W for > 5% duty cycle. 802.3at para. 33.3.7.4.	
PD LLDP Protocol Parameters	***PD-under-test powered to Type-2 Vport with 1-Event Classification and subsequent LLDP Negotiatio***			
TimeToLink	Length of time from power-up until LAN link was established. Reportsó1ôif no link established.	seconds	Information parameter ([redacted]).	
LinkSpeed	Speed of the LAN link. Reports ó1ôif no link established.	10 | 100 | 1000	Information parameter ([redacted]).	
FirstReqTime	Length of time after power-up until first LLDP Power-via-MDI request received.	seconds	Information parameter ([redacted]). 802.3at requires that a Type-2 PD should link and initiate LLDP within 5 minutes of power-up.	
PowerRequest	Contents of the PD requested power value field in the Power-via-MDI TLV.	watts	0.1 to 25.5 802.3 Clause 79.3.2.5	DLL2 DLL3 DLL4 DLL9
PDAckTime	Length of time for transmission of an updated LLDPDU after an LLDPDU with a new PSE allocated power value is received by the PD.	seconds	< 10 802.3at para. 33.6.2	DLL11
AllocPowerEchoed	Contents of the PSE allocated power value from the LLDPDU acknowledgement sent by the PD.	watts	= Allocated power value sent by PDA-600ï this will be same as **PowerRequest** so long as **PowerRequest** is valid value..	
ThrottleAckTime	The length of time it takes the PD to acknowledge receiving the new alloc value.	seconds	< 10 seconds 802.3at para. 33.6.2	
ThrottlePowerReq	The PD requested power value field in the LLDPDU containing the Throttle Ack.	watts	Information parameter ([redacted]). A PD is not required to alter its power request after power demotion.	